CLAIMS

1/ A hollow drilling rod for transmitting information, said rod being for placing in a borehole filled with a drilling mud, said rod comprising:

- an electrically conductive cylindrical wall having an inside face, an outside face, a first end provided with a male coupling sleeve, and a second end provided with a female coupling sleeve;

- a layer of electrically insulating material covering the inside face of the rod along its entire length;

- a conductive layer covering said insulating layer, said layer of electrically conductive material terminating at each of its ends close to the coupling sleeves in a conductive ring which is electrically connected to said conductive layer; and

- an additional layer of electrically insulating material covering the inside face of said electrically conductive layer, said additional insulating layer not covering the inside faces of said rings which are in contact with the drilling mud.

2/ A hollow drilling rod according to claim 1, in which said layer of insulating material also covers the inside faces of the coupling sleeves, at least for the portions thereof which do not overlap mutually when the drilling rod is assembled to another drilling rod.

3/ A hollow drilling rod according to claim 1, further comprising an electrically insulating sealing ring secured to one of its male and female coupling sleeves in such a manner that said sealing ring provides leaktightness between a male sleeve and a female sleeve when two rods are assembled together.

4/ A drilling rod according to claim 1, in which said layer of insulating material constitutes a coating on the inside face of said rod.

5/ A drilling rod according to claim 4, in which said layer of insulating material is made of an insulating epoxy resin.

6/ A drilling rod according to claim 5, in which said layer of insulating material is less than 250 μm thick.

7/ A drilling rod according to claim 1, in which said electrically conductive layer is a layer of conductive epoxy resin.

8/ A drilling rod according to claim 1, in which the conductive layer is constituted by a tube of conductive material of a thickness that is no greater than a few millimeters, and the insulating layer is constituted by depositing an insulating material on the outside face of said tube, said tube being held stationary inside said rod.

9/ A drilling rod according to claim 1, in which the length (ℓ) of each of said conductive rings (84) lies in the range 0.8 D to 2.2 D, where D is the inside diameter of said rod.

10/ A string of drilling rods for transmitting information at least between the bottom end of the string and its top end, the string being characterized in that it comprises:

- a plurality of hollow drilling rods, each rod comprising:
  - an electrically conductive cylindrical wall having an inside face, an outside face, a first end

provided with a male coupling sleeve, and a second end provided with a female coupling sleeve;

- a layer of electrically insulating material covering the inside face of the rod along its entire length;

- a conductive layer covering said insulating layer, said layer of electrically conductive material terminating at each of its ends close to the coupling sleeves in a conductive ring which is electrically connected to said conductive layer; and

- an additional layer of electrically insulating material covering the inside face of said electrically conductive layer, said additional insulating layer not covering the inside faces of said rings which are in contact with the drilling mud, said rods being assembled to one another via their coupling sleeves;

- a drilling tool fixed to the bottom end of the bottom rod of said string;

- a first electromagnetic coupling assembly placed close to the bottom end of the bottom rod in the axial bore of said rod and suitable for receiving alternating electrical signals representative of information to be transmitted; and

- a second electromagnetic coupling assembly placed in the axial bore of the top rod situated inside the borehole; whereby said second assembly is suitable for picking up an electrical signal created by current circulating in a current loop constituted firstly by said conductive layer and by said conductive rings and by the mud inside said rods, and secondly by the walls of said rods and the mud outside said rods, said current being created by the signal applied to the first electromagnetic coupling assembly.